A Fast, Cost-Effective Approach to Improve Student Retention and Graduation Rates in Higher Education

✓ Increasingly, the ability to retain and promote students not only influences college rankings, reputation and recruitment of top talent, but also impacts the bottom line.

✓ Although improving retention and graduation rates is a priority for most educators, some institutions may be overlooking opportunities to use Web-based applications and services to meet this goal.

✓ Fortunately, institutions of higher learning can use their network infrastructure and Web-based services to support both recruitment and retention efforts.

✓ The key to offering such services is a secure, reliable platform for delivering content, information and services.

This paper provides insight into the technology foundation that allows colleges and universities to reliably, securely and cost-effectively offer these services.

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Introduction

In a recent Center for Digital Education (CDE) survey, 74 percent of responding higher education decision-makers said improving student retention and graduation rates is the top goal of their college or institution.[1] The ability to retain and promote students not only influences college rankings, reputation and recruitment of top talent, but also impacts the bottom line. Enrolled students provide a steady revenue stream via tuition and other purchases (e.g., books, parking passes and food services). Student retention also allows recruitment dollars to go further by decreasing the need to continually replace students who have dropped out.

The Top 5 Higher Education Goals

01	Increase retention/higher graduation rates	74%
02	Recruit and support top students	37%
03	Promote and encourage diversity	37%
04	Recruit and retain top faculty	37%
05	Utilize technology for instruction	35%

Source: CDE Cloud Services and Web-Facing Applications Survey, 2015

Although improving retention and graduation rates is a priority for most educators, some institutions may be overlooking opportunities to use Web-based applications and services to meet this goal. When asked which Web-facing services they emphasize, 86 percent of survey respondents chose providing information to prospective students. Services that more directly support retention and graduation (e.g., providing online content to students and enabling access through mobile devices) trailed far behind.

Fortunately, institutions of higher learning can use their network infrastructure and Web-based services to support both recruitment and retention efforts. The key to offering such services is a secure, reliable platform for delivering content, information and services. This CDE white paper highlights some of the key factors influencing student attrition; discusses Web-based services that support student retention; and provides insight into the technology foundation that allows colleges and universities to reliably, securely and cost-effectively offer these services.

Withdrawal Syndrome

Student attrition from institutions of higher learning is an epidemic in the United States. According to a report by the National Student Clearinghouse, only 55 percent of first-time college students in 2008 had completed a degree within six years.[2] Most dropouts leave college before their second year.

Contrary to popular perception, poor academic performance isn't always the reason for leaving college. Factors influencing attrition include:

- **Poor preparation for college** — Many first-year students have not developed the study habits, time-management skills and other personal attributes needed to successfully navigate higher education. When they first enter college, they need programs and tools to help them adjust and stay on track.
- **Financial hardship** — According to a Public Agenda report, 60 percent of students leaving school said they had to pay for college themselves, while 60 percent of students who graduated had financial help from family.[3] Students who have financial hardships must often make a choice between dropping out and working through school, which creates its own risks.
- **Outside demands (work, family)** — The stress of balancing work, school and home life is too much for many students. In the Public Agenda report, it was the leading reason students gave for dropping out. According to the report, 45 percent of students in four-year colleges worked more than 20 hours per week. Sixty percent of community college students worked more than 20 hours per week, and more than 25 percent worked more than 35 hours per week. Twenty-three percent of college students had dependent children.[4]

- **Lack of engagement and relevance** — A study by Florida State University found that one-third of its students who dropped out were doing well academically.[5] Online courses, large lecture halls and one-size-fits-all teaching can contribute to a sense of isolation and don't always allow for personalized learning. High-achieving students, especially, may become disenchanted with college. Students today want learning experiences that are authentic and relevant, and they want learning (and learning tools) to be more seamless with their daily lives.

Using Technology to Improve Retention

To stem the loss of new students, universities and colleges are implementing first-year programs, academic advising and other interventions. Institutions are also trying to accommodate the diverse needs of all their students by offering more personalized, flexible courses and programs. To help create a well-rounded, sustainable approach to student retention, many institutions are turning to Web-facing services and other technology. In the CDE survey mentioned previously, 90 percent of respondents anticipated an increase in Web-facing applications and services over the next few years.

Given the multiple factors influencing student dropouts, it's important to use these services to create a multi-pronged approach that can address each student's unique situation. Here are a few examples of technology-based tactics that can keep students in college and help them graduate. It's a bonus that universities can also use most of these tools to recruit and support top talent.

- **Access via mobile devices** — Today's students have grown up with mobile devices, and they expect to be able to use them in every area of their lives. For many students, smartphones may be their only personal tool for accessing the Web, exchanging emails, performing calculations and more. Other students may use smartphones along with laptops and/or tablets, depending on whether they are reading, taking notes, studying or writing reports. By using such devices to connect to Web-based services, students can optimize their productivity; work at times and locations that are most convenient to them; and more successfully balance school, work and other aspects of their busy lives. Mobile devices are also an important tool for engagement, allowing students to

perform and document studies in the field; collaborate with other students, professors and researchers in virtually any location; and more.

- **Online learning and blended learning** — Because online classes enable self-paced learning and assessment, they have become an important tool for remediation, course-credit recovery, gifted-student programs and regular coursework. Besides being able to personalize learning to individual needs, online classes make learning accessible to geographically distant students and students who must schedule learning around other work-life responsibilities. While online learning has many merits, researchers are finding that blended learning models have more potential than purely online classes to improve student outcomes and reduce attrition.[6] These models typically combine online coursework with in-person interaction, real-time class discussions and other Web-based learning.

- **Monitoring, assessment and early alert systems** — By integrating information from a variety of sources (e.g., digital grade books, student information systems, learning management systems and financial aid records), higher education institutions can receive deeper insight into students' academic and financial standing, evaluate risk factors and develop appropriate interventions.

42%   **46%**
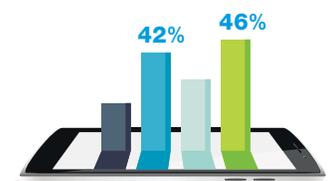
When higher education leaders were asked which Web-facing services they were considering, the most chosen responses were enabling accessibility from mobile devices (46 percent) and providing online content for students (42 percent).

- **Student portals** — Effective student portals provide students with a clear, objective picture of their entire academic life. Students can track progress in meeting degree requirements, review grades and academic standing, connect with special programs and more. Portals can also help students be more proactive about financial issues by providing a central location for tracking tuition payments, scholarships, grants, loans and work-study.

- **E-portfolios** — E-portfolios are an emerging trend in higher education. These Web-based environments allow students to publish content that demonstrates their skills, achievements, academic performance and work experience. Besides helping students see the relevance of their work and prepare for future job searches, an e-portfolio may also be an early indicator of how a student is doing in a particular course or program. According to results from a project at the University of Notre Dame, e-portfolio engagement was an accurate indicator of student success in a course.[7]

- **Video teleconferencing (VTC)** — VTC is an important tool for improving engagement among online learners, their peers and faculty; counteracting the isolation that students may feel when taking courses online; and making life easier for students who otherwise would spend time and money traveling to a physical location. Using VTC, institutions can also improve retention by offering courses and programs targeted to specific populations (e.g., gifted and at-risk students), bringing in researchers and other professionals for special lectures, offering research opportunities and enabling collaboration among universities.

Choosing the Best Delivery Platform for Web-Based Services

When creating Web-based solutions to improve retention and recruit top students and faculty, the key to success is cost-effectively ensuring a positive user experience and enhancing security. These requirements are reflected in the CDE survey of higher education officials, in which breadth of services and security were rated as the most important aspects of a website.

Positive User Experience — Anywhere, Anytime, On Any Device

To ensure students have a positive experience when they use Web-based services, colleges and universities need a services delivery platform that can provide:

- A variety of relevant, personalized online applications that are available on any device (e.g., smartphones, laptops, tablets and phablets)
- Reliable, highly available connections, regardless of location (e.g., on campus, off campus and globally)
- Rapid page loads (as a function of network routing and bandwidth)
- Flexibility (i.e., scalability) to meet rapid fluctuations in traffic volume (e.g., during VTC, course enrollment, testing periods and televised events)

Most colleges and universities do not have a services delivery platform that offers the kind of user experience that students require. They cannot deploy enough servers to deliver content to all the regions they serve, and even if they could, they would have to rely on a chain of Internet

A Recipe for Success

The following technology-based tactics can keep students in college and help them graduate. Universities can also use most of these tools to recruit and support top talent.

- ✓ **Online learning and blended learning**
- ✓ **Monitoring, assessment and early alert systems**
- ✓ **Student portals**
- ✓ **E-portfolios**
- ✓ **Video teleconferencing**

> ## What Is a CDN?
> A cloud-based content delivery network (CDN) is a network specially designed to deliver high-volume content rapidly, reliably and at scale. A CDN addresses the bottlenecks and performance problems associated with traditional networks by optimizing traffic routing, as needed, to avoid congestion.

service providers to route the content, which would ultimately result in service bottlenecks.

The ideal solution is a cloud-based content delivery network (CDN). A CDN is a network specially designed to deliver high-volume content rapidly, reliably and at scale. A CDN addresses the bottlenecks and performance problems associated with traditional networks by optimizing traffic routing, as needed, to avoid congestion. By using their own routing technology and establishing peer relationships with Internet service providers, CDNs reduce the number of "hops" that data makes across the global Internet infrastructure as it travels to its destination. Data is delivered via the best possible route.

With a cloud-based CDN, institutions do not have to invest in or maintain the infrastructure, hardware and bandwidth required to deliver Web-based services. At its most basic level, a cloud-based service uses Internet technology to deliver specific IT capabilities as needed. This model is particularly important when institutions offer services that frequently fluctuate in demand or consume a large amount of bandwidth (e.g., online courses, teleconferencing and special events). Cloud-based services have the advantage that they can significantly reduce costs, complexity and deployment time.

For those choosing a cloud-based CDN, Forrester Research recommends that prospective buyers consider three main aspects:[8]

- **Core and adjacent capabilities** — Core CDN capabilities include content delivery and caching, as well as Web acceleration; adjacent capabilities include encryption, storage, hosting, load balancing, PCI compliance and more.

- **Regional presence** — One of the key differentiators among CDNs is the global distribution of points of presence (i.e., servers that deliver content). With more points of presence, the distance between servers and destinations decreases, thereby decreasing travel time for data and transactions. The closer a CDN's points of presence are to the areas the institution serves, the faster users can access content. In addition, fewer hops helps protect against certain types of attacks.

- **Commercial strategy and client demographics** — Education leaders should ensure a prospective CDN vendor has experience providing services to colleges and universities. They should look at the vendor's pricing model(s) to determine whether billing works for the type of usage anticipated (e.g., flat monthly rate versus pay-as-you-go).

A best-in-class CDN vendor can also provide complementary solutions such as Web performance and media delivery solutions:

- **Web performance solutions** — Institutions can use these tools and solutions to accelerate websites to enable fast, personalized access to content; optimize the user's experience based on the device, network and browser being used; and fine-tune the CDN to deliver rich, dynamically generated content as quickly as possible.

- **Media services** — Colleges and universities can use media delivery services to simplify the delivery of high-quality media (e.g., for VTC, events and collaboration). These services are especially important as the number and type of connected devices expand; video and file format options become more complex; and data rates, file sizes and video quality increase. Institutions can also take advantage of media analytic services to monitor the quality of services and the user experience, and proactively make improvements when needed.

And Then There's Security

As with any mission-critical network, security is important in order to prevent downtime and data theft, comply with government regulations, and maintain reputation and trust. If a network or Web-based service is compromised, students may become leery of providing personal information, conducting transactions and

performing other tasks related to the service. If the service is repeatedly unavailable due to denial-of-service and other attacks, students will become frustrated, lose interest and potentially stop using it.

To create a secure environment for offering and using Web-based services, colleges and universities need to protect or manage the following types of assets:

- **Personally identifiable information (PII)** — To protect private information and comply with regulations such as the Health Insurance Portability and Accountability Act (HIPAA) and the Family Educational Rights and Privacy Act (FERPA), institutions must be able to protect student information systems, health records, financial records, transactional activities (e.g., tuition payments, book purchases and parking passes), classified research and more from unauthorized access, viewing, tampering and theft.

- **Websites and applications** — To maintain reputation and trust, institutions must be able to protect against website defacement, hostile takedowns, man-in-the-middle attacks (which divert unsuspecting users to a fraudulent site) and other cyberattacks.

- **Networks** — To prevent down-time and ensure services are highly available, institutions must protect their network from distributed denial-of-service (DDoS) attacks. These attacks, which are increasingly common and severe, "hijack" other computers and devices to orchestrate an attack that overwhelms a network's resources.

- **Mobile devices** — Every time a student connects to an institution's network, he or she creates a pathway into the institution's applications and systems. Cybercriminals can exploit these pathways to execute attacks and steal information. Institutions face the daunting task of managing user information from thousands of hetero-geneous mobile devices so that users securely access applications.
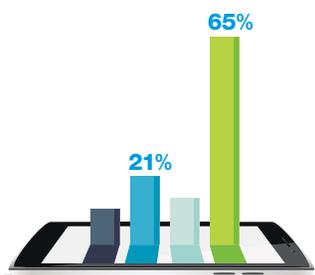
To protect assets, comply with government regulations and maintain

65%

21%

When asked about the risk of a leak of personally identifiable information or a cyberattack on their institution, **65 percent of higher education respondents considered the risk to be "somewhat high," and 21 percent considered the risk to be "very high."**

No Institution Is Immune

The news is filled with examples of high-profile university websites that have been defaced or breached. In 2013, Stanford University's systems were breached, and as a precaution, the university asked that users change their passwords.[9] In early 2015, a group of websites for the University of Washington was defaced with a threatening political message from hackers.[10] Harvard and others websites have also been defaced with political messages in recent years, and cyberattacks on infrastructure are common.[11,12] "We're seeing things in the tens of thousands a day," reported Harvard University's chief information security officer when discussing cyberattacks on Harvard's infrastructure.[13] These attacks all highlight the importance of comprehensive, properly managed, state-of-the-art security services.

trust, education leaders should choose a best-in-class, always-on, cloud-based security solution that includes the following attributes:

- An extensive, globally distributed architecture that can withstand massive attacks and provide multiple layers of defense before attacks ever reach the institution's data center

- Proven protection against large (greater than 300 gigabits per second) DDoS attacks

- Protection against man-in-the-middle attacks and other attacks on the domain name system (i.e., the system that resolves domain names to specific Internet addresses)

- Protection "at the edge" against application-layer attacks (e.g., SQL code injections and cross-site scripts) that are used to steal data

- Firewalls, secure sign-on capabilities and Secure Sockets Layer (SSL) encryption to prevent unauthorized access to networks, applications, content and other resources

- A Web-based portal for real-time monitoring of traffic and suspicious activity

- Access to real-time threat awareness, live attack intel-ligence and other relevant conditions on the Internet

- Mobile device management and security tools to ensure mobile devices access the institution's resources securely and appropriately

Finally, the chosen vendor should be an industry leader with demonstrated credibility and expertise who can effectively map the best cloud-based security solutions and their benefits to an institution's security needs and business requirements.

Moving from Adversity to Opportunity

Web-facing services and applications present promising, cost-effective opportunities for colleges and universities to achieve their educational and institutional goals. Instead of operating in crisis mode to curb dropout rates, institutions can use Web-based services to improve learning in a way that naturally supports students staying in school and completing coursework. By increasing engagement, personalizing learning and giving students more control over their academic lives, these services not only address student retention issues, but also create a learning environment that helps colleges and universities recruit new students and faculty.

The key to implementing such solutions is developing a long-term vision and then identifying the strategy, goals and steps that will bring that vision to fruition. Once an institution knows where it wants to go, it's a matter of implementing the right platform to get there. With cloud-based solutions, it can shorten the time frame to just a matter of weeks or months.

In choosing a platform to deliver Web-based services, education leaders should consider the vendor's technology capabilities, as well as its breadth of offerings. Institutions should also look at the vendor's financial stability, service level agreements, track record of mitigating network attacks and customer support services. By developing clear metrics to assess these factors, education leaders help ensure they select a cost-effective solution that is not only secure, scalable, reliable and comprehensive, but also alleviates the burdens associated with maintaining and managing such platforms themselves.

Endnotes

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